



Klinman Takes Department Reins from Bartlett

First Woman to Chair Major Chemistry Department in U.S.

This July 1 will be another historic day for the College of Chemistry: Judith Klinman takes over as chemistry chair when Paul Bartlett returns to teaching after his four-year



Judith Klinman

photo by Greg Butera

tenure. Klinman will be the first female chairperson of a chemistry department at a major research university in the United States.

Clayton H. Heathcock, Dean of the College of

Chemistry, said, "As one of the people who has pioneered the use of solid physical organic chemistry methods for the study of actual enzyme systems, Judith Klinman occupies a central place in chemical biology—an area of growing importance to the University of California in general and the Department of Chemistry in particular. I am looking forward to working with Judith as Chemistry Department Chair for the next few years."

"At first, I decided not to accept the nomination," said Klinman. "But when Clayton told me I was his first choice, I had to seriously consider it." After speaking to many colleagues, she decided it was time for someone with a major focus in biochemistry to take the lead.

"This area has a large future," she says, "and while the College [needs to improve], we are strongly committed to it, in particular, to recruiting faculty and graduate students at the interface of chemistry and biology."

"Judith's appointment as Chair could not have come at a more appropriate time for our Department," says outgoing

chair Paul Bartlett. "The physical and biological sciences are becoming integrated at an accelerating pace, so there is a critical opportunity for the College, and the University, to capitalize on our strengths. Judith's leadership and experience in both disciplines will be put to good use!"

One major new project on campus that will occur during her term as chair will involve the new health sciences and bioengineering building replacing Stanley Hall, across from Latimer. "This building will house a mix of groups from molecular and cell biology, chemistry, bioengineering and physics—a whole corridor with one of the underlying themes being biology. There is a strong chemistry role in all of this," says Klinman. "We need to encourage graduate students to train in this area and we need to give it more visibility, while breaking down traditional boundaries between biology and organic, inorganic and physical chemistry."

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Brad Moore Saying Goodbye after 40 Years

Chemistry Professor C. Bradley Moore is leaving the College, retiring after more than 40 years at Berkeley, to become Vice President for Research and Distinguished Professor of Mathematical and Physical Sciences at Ohio State University. In his administrative position, a five-year appointment, he will work with the president and the provost to help the faculty build the size and stature of OSU's research programs.



photo courtesy LBNI

Brad Moore

Moore has been on the College's Chemistry faculty since 1963, the year he received his Ph.D. from Berkeley. Moore is no stranger to administration, having served as

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A major challenge for any chair is recruiting good students and strong junior faculty appointments. "It is essential to maintain a stream of talented, vigorous faculty," says Klinman. "We also need to initiate a biochemistry curriculum for undergraduates, and we plan to pursue a training grant for graduate students in chemical biology. One goal for the near future is to implement lab rotations for graduate students at the biology/chemistry interface, before they choose a research group, (as they do in molecular and cell biology). She wants to make biochemistry a focal point while she is Chair, but says she will represent the whole department.

Other areas that she would like to improve are teaching and student evaluations. "I think we need to reduce the weight placed on student evaluations, and need to introduce peer review instead of simply judging teaching as a popularity contest." She envisions limited changes, for example, including colleagues in teaching reviews, especially for faculty members where there is evidence of solid teaching, but poor evaluation.

Another big issue under her tenure will be the seismic retrofit and the space crunch that construction will cause. "Paul Alivisatos, Rich Mathies and Clayton Heathcock did much work to fit people into labs, moving people out of Hildebrand and Latimer, and upgrading lab space," says Klinman. "We are in a period of tremendous flux, which is both challenging and exciting." At least, she says, this disruption provides some opportunity to align groups in proximity according to discipline.

Klinman earned both her A.B. and her Ph.D. from the University of Pennsylvania in her native Philadelphia before doing a year's postdoctoral work at the Weizmann Institute of Science in Rehovoth, Israel. From 1968-1978 she was with The Institute for Cancer Research in Philadelphia, rising from a postdoctoral associate to associate member. She was also an assistant professor of biophysics at the University of Pennsylvania from 1974 to 1978. Berkeley lured her here in 1978 as a tenured professor, making her the first tenured woman in the physical sciences at Cal.

Her work involves chemical, biological, and genetic techniques at the interface of chemistry and biology, and

she has had a joint appointment with the Department of Molecular and Cell Biology since 1993. She has served as the President of the American Society of Biochemistry and Molecular Biology. Among her many honors and awards are a Guggenheim Fellowship, a Miller Professorship, the Chancellor's Professorship, and membership in the American Academy of Arts and Sciences and the National Academy of Sciences. She also will receive a Doctor Honoris Causa from Uppsala University in Sweden later this month.

Her appointment comes on the heels of a report put out by MIT that showed evidence of gender-based discrimination against women in science in the United States. "I can't really comment on the situation at Berkeley now, but I do want to make certain that it isn't an issue," she says. "It is a generic problem throughout science, however, and I would like to increase the participation of women in faculty appointments, seminar programs, etc. The percentage of women appointed to new faculty positions at Berkeley has decreased during the past five years. But the MIT report is pushing university presidents and chancellors to deal with these issues."

"I am not anxious to be the 'first woman' again," says Klinman, "but we need leadership from women on campus. I can complain, but I have to do something about it, too."

She says there are subtle ways that women represent themselves differently from men, not having the same networks in place. "Women may not know where to go for information, whom to talk to, where to get money for research. Things are much improved from when I started my career, but there are clearly still problems."

Still, Klinman says that a woman's time has come. Things have changed in the landscapes of universities, with more women knowing they can excel in scientific fields. "Young women are now thriving in science, something not really possible 20-30 years ago," says Klinman. "Chemistry can attract talented women because it is now open to them." Klinman points to



photo by Irene Katsunoto

Not quite handing over the controls of the department: Chairperson-elect Klinman and outgoing chair Bartlett share a laugh at the Staff Appreciation luncheon.

Carolyn Bertozzi, one of the college's younger and frequently honored faculty members, as an example. "It's a different world now, with high expectations. Women are really involved in high-level research. When I came here 22 years ago, I was hired because of great pressure for the department to hire women. I am proud that I came, though if I knew then how tough it would be, I might not have."

"I don't want my tenure as chair to be a women's issue, even though it is an important one," says Klinman. "My goal is the integration of a functioning, cohesive group—have everyone feel a part of the department, and have no one marginalized. Paul Bartlett has done a fabulous job of this, and it is marvelous to follow him. He worked hard to bring a cohesive feeling to the department."

Klinman has 14 graduate students and postdocs in her group, and plans to continue an active research program while chair. She has three ongoing federal projects, and as has been tradition, will spend her mornings on her research and afternoons as chair. "I plan to compartmentalize, consolidate my activities, pull back from committees, and choose attendance at scientific meetings more carefully."

Her research studies protein structure and the functioning principles that govern catalysis. "Enzymes are tremendous rate accelerators," she says, "and we are trying to understand how enzyme catalysis works."

Klinman discovered that hydrogen tunneling is important for many enzyme reactions, explaining the behavior of these enzymes at a quantum level. Linus Pauling's work pointed out an enhanced binding of proteins with a substrate in a transition state as opposed to a static, ground state. Klinman's work goes beyond Pauling's research, and attempts to explain how enzymes, at room temperature, can dynamically control reactions by manipulating the barriers to the reaction. "Enzymes optimize barrier height, but they can control the width of barriers as well." The enzymes use hydrogen bonding to tunnel through these barriers.

"We are trying to understand what aspects of protein dynamics facilitate the tunneling process," says Klinman. "Proteins are large, flexible molecules, an ensemble of structures." Hydrogen tunneling makes researchers think about how enzymes work in a dynamic setting, not just classical views of static molecules. One project studies proteins from thermophilic bacteria, analyzing tunneling as a function of temperature. "These proteins get rigid as the temperature

goes down, and tunneling decreases as well," says Klinman. "In small molecule systems, tunneling increases as temperature decreases. Through this research we demonstrated a link between the flexibility of protein backbones and the capacity of a protein to make or break chemical bonds."

A second area involves quinoproteins, which she discovered 10 years ago. Cofactors are generally small molecules that bind and confer chemical reactivity to proteins," she says. "Quinoproteins make their own cofactors, so they have a dual function." It is very unusual for a single protein to have multiple functions, such as creating a cofactor and then performing the protein's main reaction. This research combines kinetics, mutagenesis and x-ray crystallography to try and understand how these special proteins work.

Her third research project studies the effect of oxygen on proteins. "Oxygen (O_2) is kinetically unreactive, but can be reduced with electrons," says Klinman. "This creates intermediates that can do damage [to a cell.] Proteins somehow create these free radicals without getting inactivated by them." She has developed a set of probes that look at how enzymes can perform oxygen activation. Once the underlying principles are understood, she hopes to be able to re-engineer proteins to perform altered functions.

Regardless of her research and her new duties as chair, Klinman says that family is a high priority, and with one grandson and two more grandchildren on the way, she plans to make time for them in her life. "I'm proud of my children and grandkids," says Klinman. "It's important to have family and career—a balanced, full life. I've been lucky in that I've been able to combine my family and science, and also have time in my career to throw myself into my research." She discovered hydrogen tunneling about the time that her younger son went off to college. "I finally could immerse myself in research," says Klinman. "Unlike my male colleagues, women may peak later in science if they have a family. Women need to be encouraged if that is what they want, and universities should be understanding of that. Having full lives is important."

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both Vice Chair and Chair of the Department of Chemistry and as the Dean of the College of Chemistry from 1988-1994, when he was instrumental in raising funds for Tan Hall. He has been Division Director of the Chemical Sciences Division at Lawrence Berkeley National Laboratory (LBNL) since September 1998.

“It’s hard to imagine Berkeley Chemistry without Brad Moore. He has had an impact on every facet of the College, whether you look at our new buildings or the way we teach undergraduates. We’ll all miss his energy and commitment (I’ll particularly miss his advice!), but wish him the best in his new position.”

— Paul Bartlett, Chairman of Chemistry

“I really wanted to take this opportunity to look at research from a university-wide perspective,” says Moore. “The powerful new tools for research that have been developed during the last few decades make it possible to attack much more complex problems than we have tackled before. The problems usually require input and fundamental advances from many disciplines and often have the potential for great practical impact. Universities are not yet very good at large multidisciplinary projects. The chal-

“Brad Moore was already a Berkeley fixture when I joined the faculty in 1964. Over the years I have enjoyed a multi-faceted relationship with Brad. We served as the two Vice Chairs of the Chemistry Department in the early 1970s, and I reported to him when I was Chair of Chemistry and he was Dean of the College in the late 1980s. But our most important relationship has been our membership in the Berkeley Hills Wine Tasting Group, a group of ‘social drinkers’ who meet from time to time on Sunday evenings to partake of the grape. We will all miss Brad and Penny Moore in many ways. We wish them well in their new adventure and hope that they will make regular homecomings a part of their new midwestern lifestyle.”

— Clayton Heathcock, Dean

lenge is to make it easy for faculty from many different departments and colleges to work together and to obtain the resources to build major new programs and to do it in a way that simultaneously builds the strengths of each of the basic disciplines.”

There will be many things he will miss, of course, especially when he is shoveling out his driveway next winter, but the Moores are keeping their house in Berkeley, have many friends here, and expect to return. “Berkeley has been good to me for 40 years,” he says. “I hope to be welcomed back as an active emeritus professor when I return.”

“Brad Moore has been one of the great leaders on the Berkeley campus for as long as I have been here. I especially value the guidance and advice he gave me when I started as an Assistant Professor. He has always had great dreams and penetrating insights, and I will miss him very much.”

— Paul Alivisatos, Professor of Chemistry



photo by Bruce Cook

Moore with members of his research group at his 60th birthday party. Left to right are Moore, Tanya Mazur, Art Bragg and Aaron Mann. The celebration was tinged with a bit of sadness since it was held right around the time he announced his impending departure.

He has had a distinguished career with many awards, including a Guggenheim fellowship, the E. O. Lawrence Memorial Award from the U.S. Department of Energy, the California Section Award from the American Chemical Society, University of California, Berkeley Staff Assembly’s Excellence in Management Award, the Earle K. Plyler Prize of the American Physical Society, and election to the American Academy of Arts and Sciences and the National Academy of Sciences.

Penny Moore will continue as director of *Prime Science*, the curriculum program for middle and high school science teaching that she has headed at Berkeley for several years. “Penny is looking at other opportunities in Colum-

“No one has given more of himself to an institution than Brad has to Berkeley: in addition to his own outstanding research and teaching contributions, his unselfish leadership as Chairman and Dean of Chemistry, and as head of the Chemical Sciences Division (LBNL), he has greatly enhanced all our careers. In my own specific case, we have had two or three truly outstanding, serendipitous scientific collaborations that have been among the most enjoyable and satisfying of my career. He will be deeply missed, but I hope not for too long!”

— Bill Miller, Pitzer Distinguished Professor of Chemistry

bus, as well,” says Moore, but Prime Science is staying at Berkeley, and she will stay on as a director with a much longer commute.

Part of Moore’s research group is moving with him. The past two years have been hard on the group, he says. “We already moved once, a year-and-a-half ago, and are now moving the whole lab again.” Two first-year students are staying at Berkeley and moving into other research groups, one is staying here and finishing, and the other two are going to OSU with Moore.

Their new labs will be housed in a lab facility built specifically for laser research. “A neighboring group is doing work complimentary to my research, so we’ll be holding joint seminars and collaborating on projects with them,” says Moore. Moore says he envisions his responsibilities will not impact his time much differently from his work here as professor and as director at LBNL.

“My dear friend Brad Moore is a great pioneer in the development and application of lasers in chemical research, and an outstanding leader and teacher who has immeasurably enhanced the welfare of our college and advanced the course of science education. A wise, deeply loyal and revered colleague, he has selflessly devoted, with boundless energy, forty years of his life to Cal, contributing creatively to the many dimensions of our beloved institution. Brad and Penny, we wish you the very best—our loss is Ohio’s good fortune. We shall miss you; you will be in our minds and in our hearts.”

— Alexander Pines, Seaborg Professor of Chemistry

His group’s research uses lasers to excite molecules to selected energy states and studies the ensuing reactions to learn how chemical bonds break and form. They seek to understand how energy flows among the bonds of a molecule, how molecules move through transition states, and how energy is released to the products of a reaction. Moore works to develop quantitatively predictive models for reactions that can be useful in modeling combustion and atmospheric chemistry.

Moore says that the most fascinating part of his research is “learning how chemical reactions really work. The fun part is learning new things with great students.” And as for his legacy to Berkeley, Moore says, “Contributing to the success of people that worked with me is the most important contribution I have made.”

Staff Appreciation Lunch

This May 4th, Dean Heathcock reinstated a longtime tradition in the College, the annual Staff Appreciation Day luncheon. The last one had been held nearly a decade ago. Nearly 200 staff and faculty members, including retirees, gathered at the International House auditorium to celebrate staff contributions. Rollie Myers, professor emeritus, shared some memories of the past 50 years at Berkeley, and a good time was had by all.



Willie Weaver and retiree Gretel Gallardo looking over the buffet line.

photo by Greg Baterra

The entire group of Information Systems staff were in vacation mode at the luncheon. They will soon be saying “aloha” to Jolene Adams, who will be retiring this summer.



photo by Irene Katsumoto

Employees honored with more than 35 years of service: Marcia Bogart and Willie Weaver. More than 30: Brenda Jefferson and Virginia Mohler. More than 25: Edmundo Angeles, Wai Chan, Cheryn Giebe, David Koh, Heather Levine, Michael Murphy, Betty Rancatore, Jane Scheiber, Lorna Woelfel, and Wendy Zukas .

Fréchet Elected to NAS and Honored by ACS



Jean Fréchet and Dean Clayton Heathcock, celebrating at a reception in honor of Fréchet's recent elections to both the NAS and NAE.

photo by Greg Butera

Our last newsletter highlighted Chemistry Professor Jean Fréchet's election to the National Academy of Engineering. Shortly before press time, the National Academy of Sciences elections were announced. Sure enough, Fréchet was listed there as well. To be elected to one academy is an honor, but to be recognized by both demonstrates something more uncommon—contributions to both science and engineering. Only one other College faculty member,

Chemical Engineering Professor John Prausnitz, holds membership in both academies.

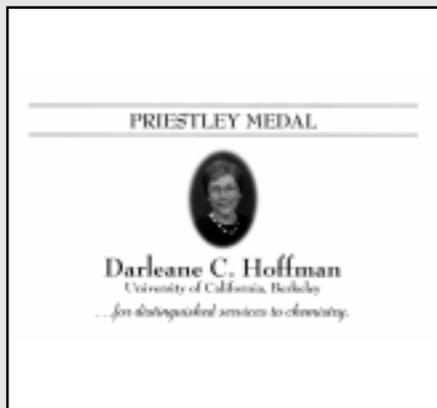
Fréchet was also honored by the American Chemical Society with the ACS Award in Polymer Chemistry at the recent annual meeting in San Francisco.

His research studies the structure and properties of polymers, and attempts to develop and understand novel polymers with applications in both the semiconductor and pharmaceutical industries. See the last issue of the newsletter for an in-depth story on Fréchet's research.



Hoffman Delivers Priestley Address at ACS Meeting

Darlane Hoffman, Professor of the Graduate School, was the 2000 recipient of the Priestley Medal, the highest award presented by the American Chemical Society. Her speech, "The New Millenium," was the keynote address at the award ceremonies in March. A story about this award can be found in the May 1999 issue of the newsletter.



Johnston Honored at ACS Symposium

Chemistry Professor Harold Johnston was honored for his 80th birthday by former students, postdocs, and colleagues at a symposium held over several days during the ACS annual meeting in March. A festschrift in his name will be published in *The Journal of Physical Chemistry*, and a lectureship in his name is being established at Berkeley by former students and colleagues.

Johnston, right, with Nobel Laureate Dudley Herschbach, the M.C. of the dinner in his honor.



photo by Peg Skorpinski

HHMI Names Bertozzi, Arkin as Investigators

Carolyn Bertozzi, associate professor, and Adam Arkin, assistant professor of chemistry, were recently announced as Howard Hughes Medical Institute (HHMI) investigators. Out of a field of 430 nominees in a national competition, 48 scientists from 31 institutions were chosen. They will join 305 HHMI investigators across the United States, a group whose honors last year included the Nobel Prize and the Lasker Award.

“All of us are tremendously excited for our colleagues, although I have to say that we’re not surprised,” says Chemistry Chairman Paul Bartlett. “Carolyn and Adam are doing spectacular work at the chemistry-biology interface, and we were pretty confident in nominating them. We are of course delighted, not only for the impact that the Hughes appointments will have on their research and their careers, but also for the boost they will give to the Berkeley Health Sciences Initiative.”

The Institute is a medical research organization that has entered into long-term research collaboration agreements with 72 medical schools, universities and research institutes nationwide, where its investigators hold faculty appointments. Under these agreements, HHMI investigators and their teams, who are employees of the Institute, carry out research with considerable freedom and flexibility in HHMI laboratories located on the various campuses. This model emphasizes “people, not projects” and differs from the grants approach used elsewhere. HHMI expects to spend between \$500,000 and \$1 million annually for each of its new investigators, including support to the host institutions for graduate training, library resources and other needs.

Hughes investigators have traditionally carried out biomedical research in fields such as cell biology, genetics, immunology, neuroscience and structural biology. It is relatively rare for chemists to be selected.

During the past few years, HHMI scientists have made significant discoveries related to heart disease, cancer, AIDS, diabetes, tuberculosis, obesity and many other medical problems. They also have developed important new research tools.

Saykally Wins Langmuir

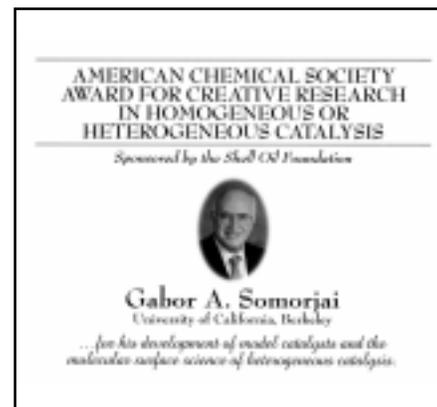


Rich Saykally, chemistry professor, was presented with the Irving Langmuir Award in Chemical Physics at the ACS annual meeting in San Francisco last month. The highest award for chemical physics in

the United States, it is awarded in alternate years by the ACS and by the American Physical Society.

Somorjai Honored by ACS

Professor of Chemistry Gabor Somorjai received the ACS Award for Creative Research in Homogeneous or Heterogeneous Catalysis. Somorjai was also honored with a symposium during the ACS meetings, and a special festschrift issue of *The Journal of Physical Chemistry* for his 65th birthday.



On “Take Your Child to Work Day” we found Paul Torres, Liberty Collier, Abby and Sharron Mueller, Griffin Newmark, Doty and Katlyn Valrey tromping around offices. Here they are shown holding the “slime” they made in one of the labs.

photo by Greg Butera

Noteworthy News

Chemical Engineering Professors **Harvey Blanch** and **John Newman** were recently honored by the Northern California Section of the American Institute of Chemical Engineers. Newman received the Award for Excellence in Industrial Research, and Blanch for Excellence in Academic Research.

This March, Adjunct Professor **Julie Leary**, Director of the College Analytical Facilities, became the first woman to win an award from the American Society for Mass Spectrometry. On June 14, she will receive the 2000 Biemann Medal, which recognizes a significant achievement in basic or applied mass spectrometry made by an individual early in his or her career. Leary is also the first winner of this award who received her Ph.D. under Klaus Biemann.

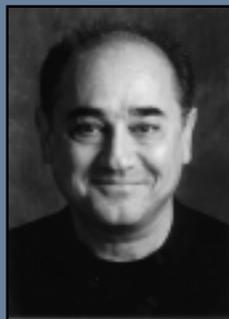


Julie Leary

photo by Greg Butera

Commencement 2000

This year's Commencement ceremony will take place on Sunday, May 21, 2000 at 2:00 p.m. on the College of Chemistry Plaza. Delivering the commencement address will be Alexander Pines, Seaborg Professor of Chemistry at UC Berkeley.



Alex Pines

photo courtesy LBNL

The graduating class this year (students finishing their degree requirements anytime from Summer '99 through Spring '00) includes:

B.S. Chemistry -- 59
A.B. Chemistry -- 13
B.S. Chemical Engineering -- 95
M.S. Chemistry -- 9
M.S. Chemical Engineering -- 13
Ph.D. Chemistry -- 54
Ph.D. Chemical Engineering -- 15

Laura Kaufman, a student in Graham Fleming's group, was selected as the winner of the 2000 Iota Sigma Pi Anna Louise Hoffman Award for Outstanding Achievement in Graduate Research.

Clayton Radke, professor of chemical engineering, was this year's Collaboratus Lecturer at Rutgers University.

Berkeley Chemistry #1 and Chemical Engineering Again #2 Among U. S. Colleges and Universities

Berkeley's chemistry and chemical engineering graduate programs are still rated first and second in the nation, respectively, according to the 1999 *U. S. News and World Report* survey.

The annual survey is released every spring and ranks university graduate programs through a survey of U. S. academics in each discipline. Chemical engineering's ranking is based on a survey of engineering deans.